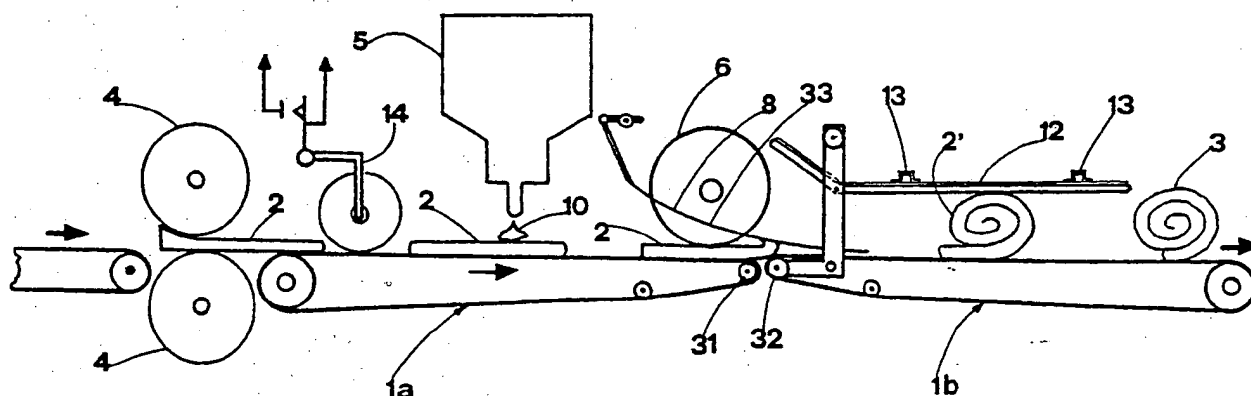




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(54) Title: PASTRY-ROLLING MACHINE, IN PARTICULAR FOR PASTRIES WITH FILLINGS



(57) Abstract

The machine is designed for use in the pâtisserie industry for the manufacture of croissant type pastries, in particular those having a filling of jam, cream or the like, and comprises a conveyor loop (1) carrying pieces of dough (2) which receive a measured quantity of the filling (10) and are then rolled into pastries. A pair of hinged or flexible elongated elements (8), suspended either marginally, above or in direct contact with the conveyor surface, and located above the outer edges of the single piece of dough (2), provide the means by which pieces of dough proceeding along the conveyor are

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Pastry-rolling machine, in particular for pastries  
with fillings.

The invention described herein relates to a machine for rolling pastries with fillings.

Such a machine is intended for use by the pâtisserie industry, though not necessarily limited to such use,  
05 in the manufacture of pastries such as croissants and the like, which are rolled from flat pieces of sweetened dough cut to an appropriate size and shape.

In addition to hand-rolling of such pastries, there are rolling machines currently used wherein pieces of  
10 dough carried along by a conveyor belt are flattened between two rolls and taken up by two conveyor belts, set at a given angle in relation to one another and running at different speeds, which coil up the flat pieces of dough turned out by the rolls.

15 In the particular instance of croissants, the piece of sweetened dough takes the shape of an isosceles triangle proceeding with its base foremost, disposed normal to the direction of movement of the conveyor. Machines of the type in question are not able, how-  
20 ever, to accomplish the rolling process successfully where pastries are to be turned out with a filling, which generally will consist of a measured quantity of jam, cream or such like.

Mechanical rolling produced by machines of the prior art type would be such as to squash and spread the filling due to the action either of the rolls or the angled conveyors.

05 In short, the filling would be squeezed out of the pastry and deposited, inevitably, on the components of the machine, rendering the machine itself useless. Thus it happens that pastries with fillings, of the croissant type, have been hand-rolled hitherto.

10 The main object of the invention is that of setting forth a rolling machine capable of providing speedy, problem-free mechanized rolling of filled pastries. One advantage of the invention is that of its versatility; the machine can be used for any type of pastry  
15 with or without filling.

The stated object and the attendant advantages are realized in a rolling machine as disclosed herein and as characterised in the appended claims.

20 The invention will now be described in detail, by way of example, with the aid of the accompanying drawings in which:

fig 1 is the schematic representation of a first embodiment of the machine, seen in side elevation;

fig 2 is the view of fig 1 from above;

25 fig 3 is the schematic representation of a second embodiment of the machine, seen in side elevation;

fig 4A shows a detail of fig 3 in enlarged scale, and more exactly, the area between a first and a second conveyor belt, illustrating the moment in which the  
30 leading edge of the pastry begins to roll up;

fig 4B shows the same detail as in fig 4A, illustrating a moment immediately following that of fig 4A; fig 5 is the detail of fig 4A seen from above.

With reference to figs 1 and 2 of the above drawings, 05 1 denotes, in general terms, a conveyor belt loop on which pieces of dough 2 are carried forward prior to their ultimate formation into pastries 3.

Each single piece of dough 2 is substantially in the form of an isosceles triangle proceeding with its 10 base leading in and lying normal to the direction of movement of the conveyor 1. The pieces of dough 2 are rolled flat by a pair of rolls 4 and then conveyed beneath an automatic metering dispenser 5, which may be controlled electronically, for instance, and is 15 designed to deposit a measured quantity of filling 10 such as jam, cream or the like, onto each triangle of dough 2 passing below on the conveyor.

The machine comprises sensors 14 designed to signal proximity of the pieces of dough as they pass along 20 the conveyor, thereby triggering operation of the metering dispenser 5 such that it may deposit the aforesaid measured quantity of filling 10 (jam, cream or whatever) directly onto the centre of the dough 2 during its passage therebeneath.

25 With a measured quantity of filling duly deposited, the piece of dough 2 continues forward urged against the conveyor 1 by two pressure wheels 6 the purpose of which is to maintain the dough 2 firmly in contact with the surface of the conveyor 1 as the pastry is 30 rolled up. The force exerted by such wheels 6 can be

adjusted, the wheels themselves being driven at the same surface speed as the conveyor 1 and disposed at either side of the central area of the dough such that no contact is made with the filling 10 deposited thereon.

8 denotes a pair of elongated elements 8 located adjacent to and downstream of the area occupied by the pressure wheels 6, and extending forward longitudinally in the direction of movement of the conveyor 1.

10 In a first embodiment of the invention illustrated in figs 1 and 2, the elongated elements 8 in question take the form of rigid laths 21 made fast to one end of, and thus carried by, a pair of relative brackets 22 exhibiting a right angle profile. The remaining end of each bracket 22, located above and upstream of the lath 21, is hinged about a transverse horizontal axis 23 so that each lath 21 is able to swing through a vertical and longitudinal plane whilst remaining stationary, to all intents and purposes, through the direction of movement of the conveyor 1.

Each lath 21 incorporates a downward-angled upstream section, and a downstream section which lies parallel with the top surface of the conveyor 1, and rests thereon. The laths 21 are disposed parallel with one another and with the outward-facing surfaces of the pressure wheels 6; thus, the laths 21 engage parts of the piece of dough 2 (the two outer edges) that are not occupied by the deposited filling 10.

The undersides of the laths 21, which make contact with the piece of dough 2 being rolled, are embodied

such that the dough will grip them when in movement and roll without any appreciable degree of slip; more precisely, the surface might be serrated, or otherwise roughened in such a way as to enhance grip with the dough.

Duly flattened by the rolls 4 and provided with the filling 10, the piece of dough 2 proceeds along the conveyor 1 until its leading edge (i.e. leading in the direction of movement of the conveyor) comes up against the angled section of the laths 21. At this point, the underside of the piece of dough 2 adheres to the top surface of the conveyor 1, urged there-against by the pressure wheels 6, as its leading edge makes contact with the undersides of the laths 21 and is forced to grip them, curling upwards as a result and turning back on itself as illustrated in fig 1. With the conveyor loop still turning, the dough 2 is obliged to roll due to the action of the laths 21 which, during this rolling sequence, are caused to rise and pivot about the aforementioned horizontal axis 23 by reason of the increasing height of the rolled pastry.

It is the weight of the laths 21 and the brackets 22 which, bearing down on the dough, cause it to grip the undersides of the elements 8 in this embodiment. It will be observed that the laths 21 engage the two outer edges of the piece of dough, thereby leaving the central area relatively free from compression. 25 denotes a sheet of washable material suspended above the conveyor 1, downstream of the laths 21. The

upstream end of the sheet 25 is made fast, whilst the sheet itself is non-rigid, and is simply draped over the top surface of the conveyor 1; the sheet 25 thus arranged makes contact with the part-rolled pastries as they exit from the laths 21, bringing the rolling process to completion.

On exiting ultimately from the sheet 25, the dough will have been fully rolled into the filled pastry 3 which is thus ready for baking.

10 In a second embodiment illustrated in figs 3, 4A, 4B and 5, one has a number of variations on the first embodiment.

The conveyor belt loop 1 is replaced by two distinct conveyor belts: a first belt 1a, and a second belt 1b located downstream of the first; the exit point 31 of the first belt 1a is located in close proximity to the entry point 32 of the second belt 1b. It will be observed also that the entry point 32 of the second belt lies marginally higher than the exit point 31 of the first; such an arrangement causes the leading edge of a piece of dough 2 conveyed along the first belt 1a to curl upward on coming up against the entry point 32 of the second belt 1b, thereby ensuring the rolling action. The height of the entry point 32 in relation to the exit point 31 can be adjusted.

8 again denotes a pair of longitudinally-extending elongated elements, located directly above the area occupied by the exit and entry points 31 & 32.

In this embodiment the elements 8 each take the form of a strip 33 of flexible material (an elastomer for



instance) the upstream end of which is made fast to a horizontal cross rail 15.

The strips 33 in question incorporate an upstream section angled downward toward the conveyor belt 1b following the direction of movement, and a further section which rests on the belt 1b. The angle of the upstream section can be adjusted so as to alter the resilience of the strip 33 when bearing down on the pieces of dough 2. The inherent flexibility of the strips 33 is such that their movement occurs within a vertical and longitudinal plane whereas no such movement occurs, to all intents and purposes, through the direction of movement of the conveyor belts 1a & 1b. As in the case of the laths 21, the undersides of the strips 33 make contact with the pieces of dough 2 to the end of rolling them, and as such are serrated or otherwise roughened to enhance grip on the dough and thus limit any appreciable slip relative thereto. The strips 33 are disposed parallel with one another and with the outward-facing surfaces of the pressure wheels 6; thus, the strips 33 engage parts of the piece of dough 2 (the two outer edges) that are not occupied by the deposited filling 10. In receipt of its filling 10, the piece of dough 2 proceeds along the first conveyor belt 1a until its leading edge (i.e. leading in the direction of movement of the conveyors) comes up against the entry point 32 of the second belt 1b which, it will be remembered, is raised marginally in relation to the exit point 31 of the first belt 1a. The leading edge

is forced upward under the influence of the movement of the second belt 1b, and caused to make contact with the undersides of the strips 33 (the position of the dough illustrated in unbroken line, in fig 4A).

05 At this point, the underside of the piece of dough 2 adheres to the top surface of the conveyor 1a, urged thereagainst by the pressure wheels 6, whereas its leading edge makes contact with the undersides of the strips 33 and is forced to grip them, curling up as a  
10 result and turning back on itself.

The undersides of the strips 33 are rendered rough by serration or similar means. The initial backward curl of the leading edge of the dough 2 and its subsequent rolling-up is thus brought about by a combined action  
15 of the two belts 1a and 1b and the strips 33 which, during the rolling sequence, bend upwards by reason of the increasing height of the rolled pastry beneath (the position illustrated in broken line, fig 4A).

The weight and the resilience of the bent and lifted  
20 strips 33 as they bear down on the dough thus enhance grip between the pastry and their rough undersides.

It will be observed that the strips 33 engage the two outer edges of the piece of dough, thereby leaving the central area relatively free from compression.

25 The second embodiment differs further from the first in that the sheet which brings rolling of the pastry to completion is rigid, and fixed. The rigid sheet, denoted 12, located at the point where rolled pieces of dough clear the ends of the strips 33, lies above  
30 the second belt 1b and immediately downstream of its

entry point 32. The underside of the rigid sheet is lined with a soft material, such as foam rubber, this in turn being faced with a washable plastic covering disposed face down toward the conveyor belt 1b.

05 The rigid sheet 12 is supported by two horizontal cross rails 13, and comes into contact with the part-rolled pieces of dough 2 in order to bring rolling of the pastry to completion; the height and position of such a rigid sheet 12 is easily adjusted.

10 Fig 4B illustrates a part-rolled piece of dough 2' about to pass under the rigid sheet.

A machine for rolling filled pastries according to the description and illustrations is fully automated, and no danger exists of the pastries being squashed  
15 such that the filling will be squeezed therefrom and foul parts of the machine. It will be observed that the same machine can be employed to roll unfilled pastries without there being any requirement for adaptations or modifications.

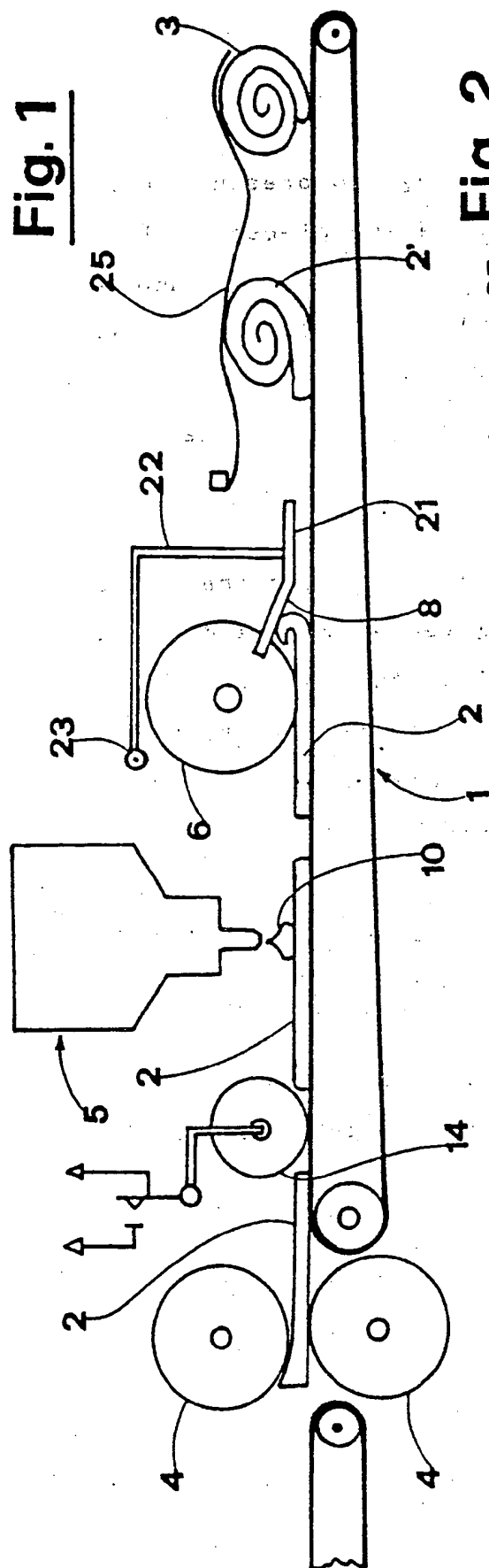
Claims

- 1) Pastry-rolling machine, in particular for croissant type pastries with fillings, characterised in that it comprises:
  - a conveyor loop carrying pieces of dough to be rolled into pastries, onto each of which a measured quantity of filling is deposited;
  - at least one elongated element extending in the longitudinal direction, swinging freely in a vertical and longitudinal plane whilst remaining substantially immovable through the direction of movement of the conveyor, and suspended a short distance above the conveyor whilst making contact with the top surface thereof;wherein the underside of such an element is designed to make contact with the piece of dough proceeding along the conveyor, and is embodied such that the dough will grip thereon when in movement and roll thereagainst without any appreciable degree of slip; and wherein the underside of the element is located so as to engage a part of the dough other than the area occupied by the filling.
- 2) Machine as in claim 1 wherein the elongated element incorporates at least one upstream section angled downward toward and following the direction of movement of the conveyor.

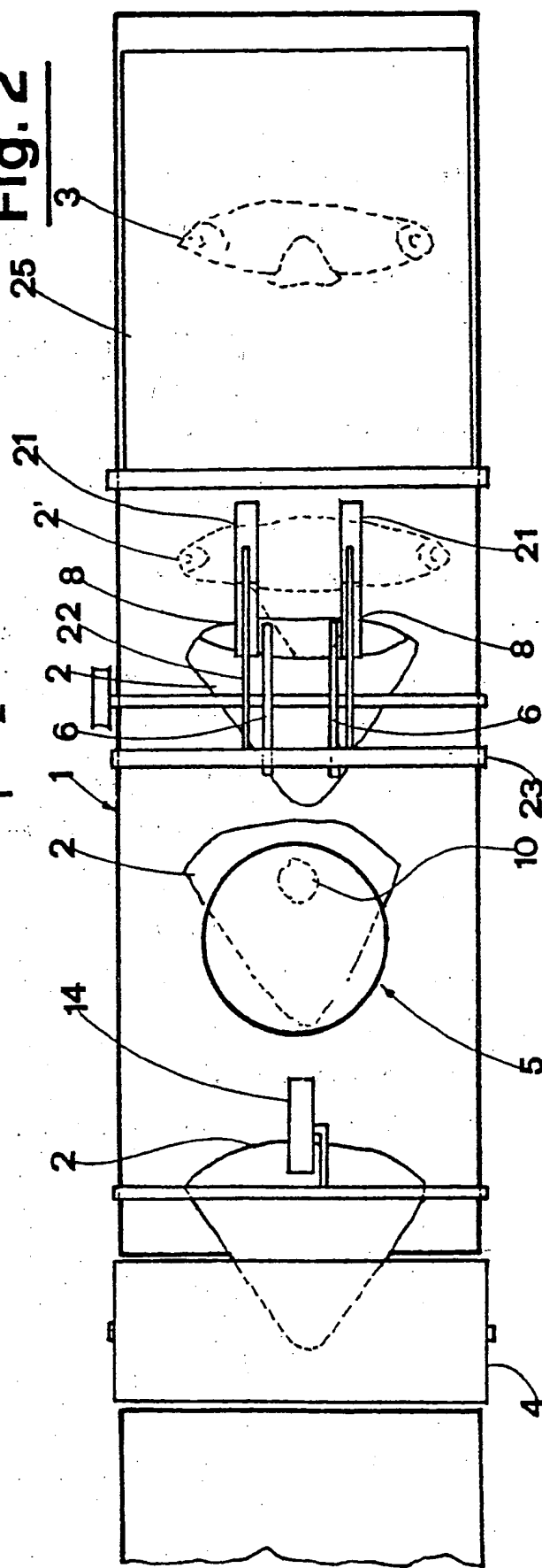
- 3) Machine as in claim 1 wherein the elongated element consists of a rigid lath free to swing about a transverse horizontal axis located upstream of the lath itself; and where the upstream section of the lath is angled downward.
- 4) Machine as in claim 1 wherein the elongated element consists of a strip of flexible material the upstream end of which is made fast.
- 5) Machine as in claim 1 wherein the underside of the elongated element offers a surface suitably roughened so as to enhance grip with the pieces of dough.
- 6) Machine as in claim 1 wherein use is made of at least two elongated elements, paired and disposed parallel in order to engage the two outer edges of the single piece of dough to be rolled.
- 7) Machine as in claim 1 the conveyor loop of which comprises a first conveyor belt providing an exit point, and a second conveyor belt located downstream of the first and providing an entry point, wherein the entry point of the second conveyor belt is located a short distance from and at greater height than the exit point of the first conveyor belt; and wherein the elongated element is located directly above the area occupied by such exit and entry points.

- 8) Machine as in claim 1 comprising two pressure wheels the purpose of which is to urge the pieces of dough against the top surface of the conveyor and ensure their adhesion thereto immediately upstream of the point where rolling of the pastry commences; wherein such wheels are located at either side of the area occupied by the filling.
- 9) Machine as in claim 1 comprising a rigid sheet located downstream of the elongated element and faced with soft material, this in its turn provided with a plastic covering, the purpose of which is to bring rolling of the pastries to completion once conveyed clear of the elongated element.
- 10) Machine as in claim 1 comprising an automatic device located upstream of the elongated element, serving to dispense measured quantities of filling and operated automatically by sensors which signal proximity of the pieces of dough approaching on the conveyor loop.

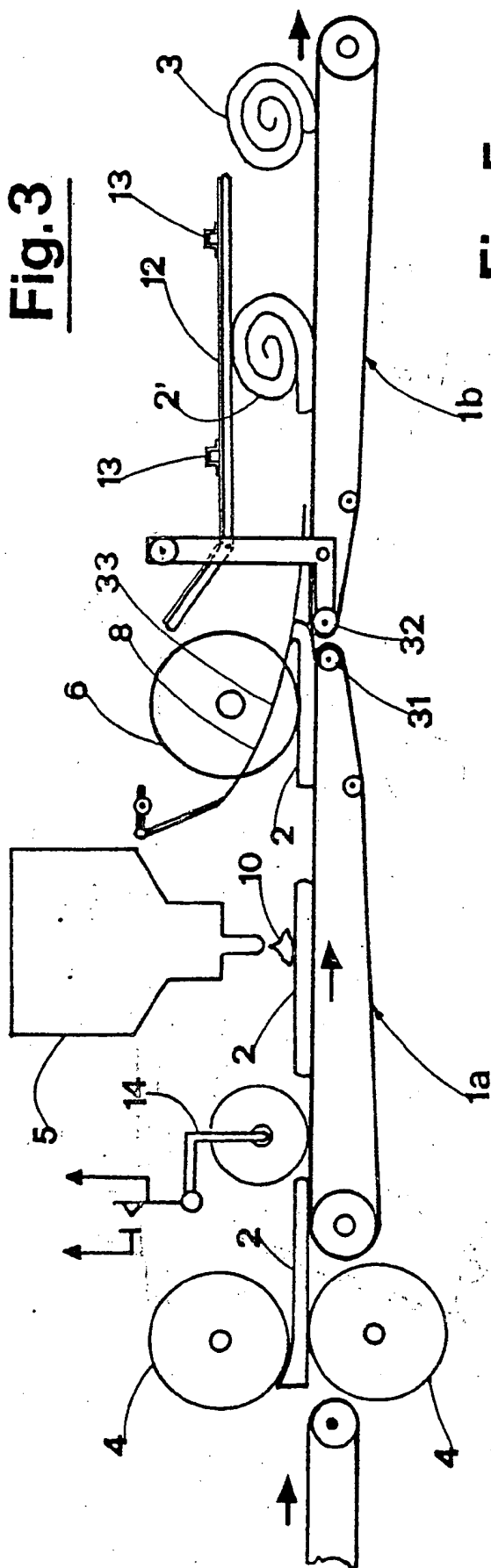
**Fig. 1**



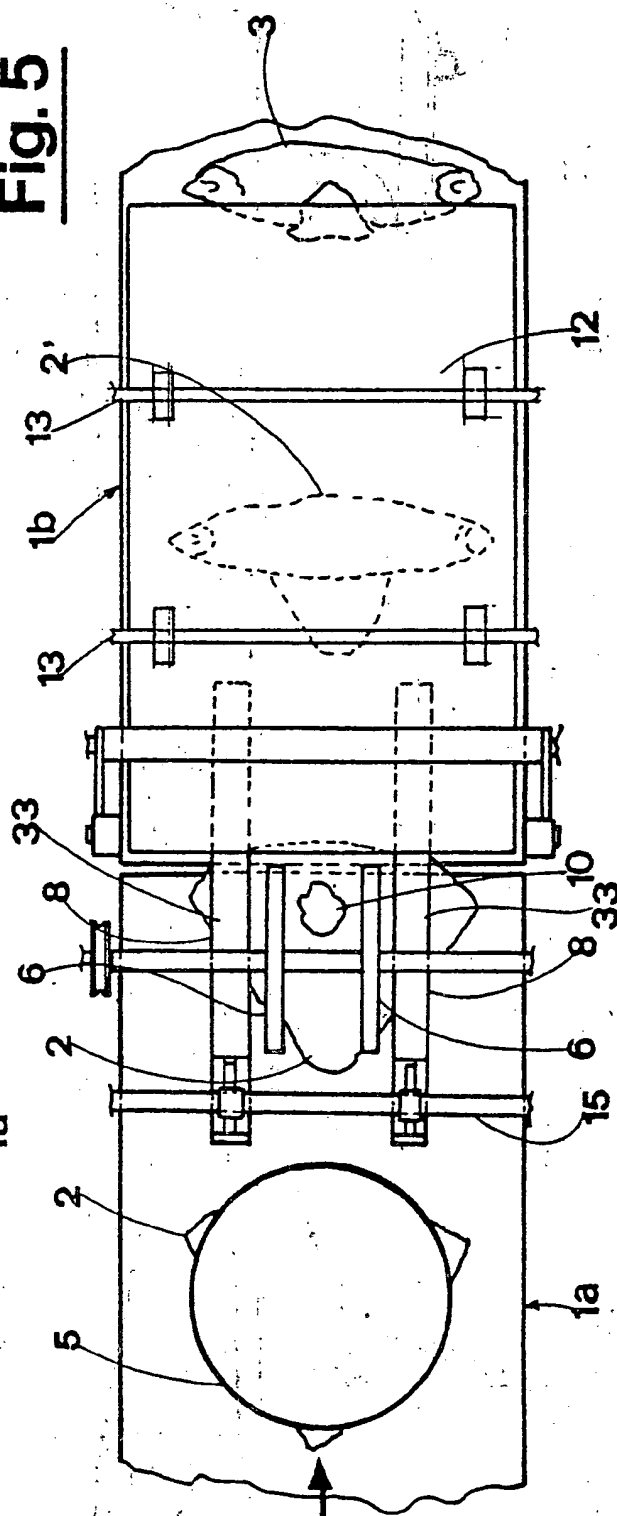
**Fig. 2**



**Fig. 3**

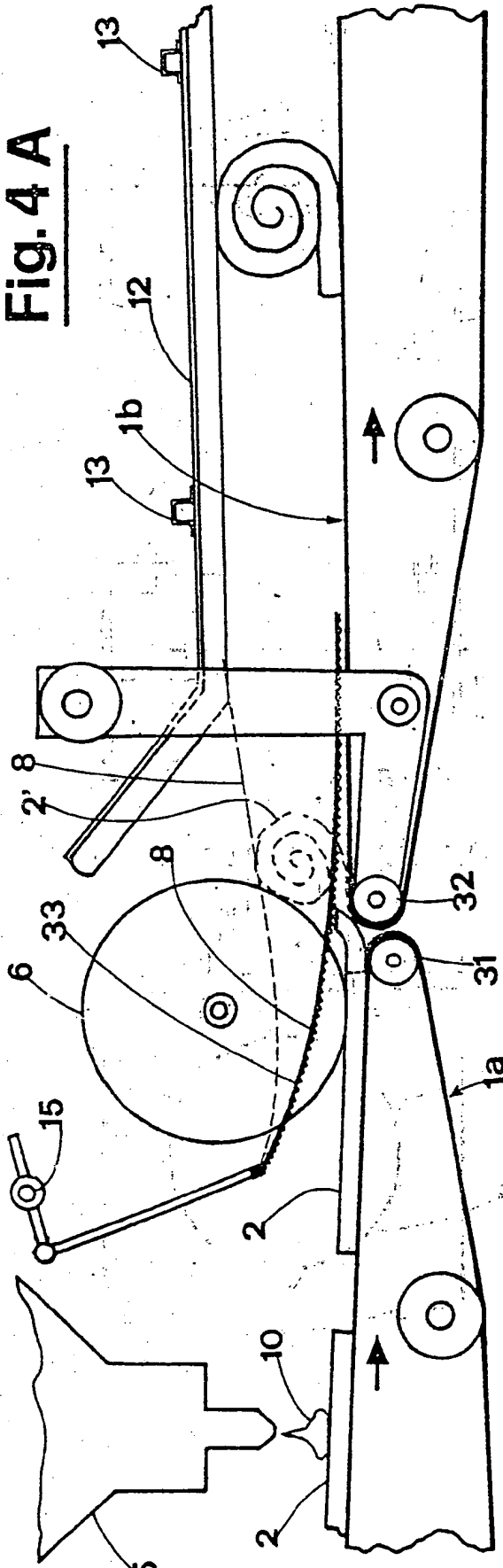


**Fig. 5**

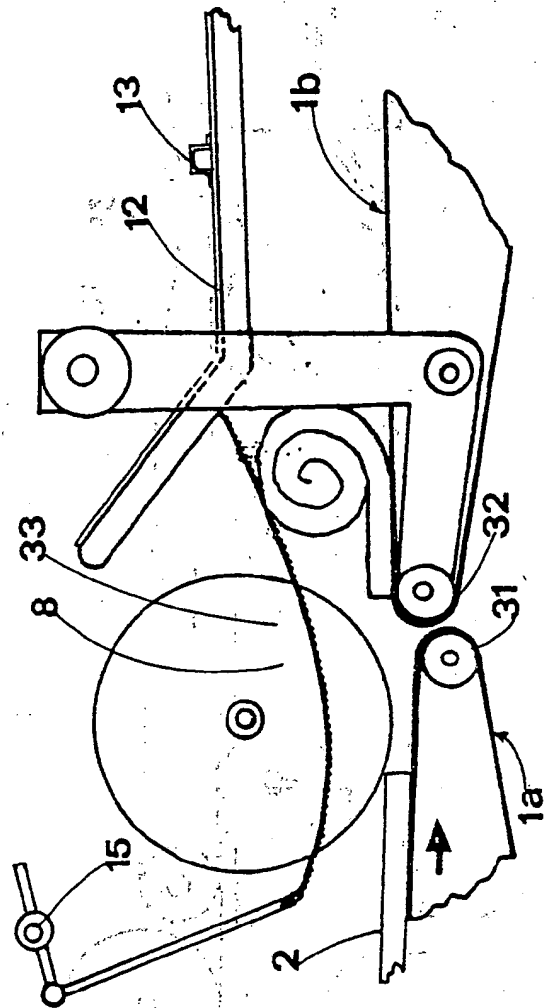




**Fig. 4 A**



**Fig. 4 B**



# INTERNATIONAL SEARCH REPORT

International Application No. PCT/IT 85/00047

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) \*

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC<sup>4</sup>: A 21 C 3/06; A 21 C 9/06

## II. FIELDS SEARCHED

Minimum Documentation Searched \*

Classification System

Classification Symbols

IPC<sup>4</sup>

A 21 C

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched \*

## III. DOCUMENTS CONSIDERED TO BE RELEVANT \*

Category *	Citation of Document, <sup>11</sup> with Indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	US, A, 4073953 (E. TROSTMANN et al.) 14 February 1978; see the whole document	1-3,6
A	US, A, 1796922 (W.H. ESEMAN) 17 March 1931, see figures 1,2,10-15	1,2,6
A	US, A, 1537018 (F.X. LAUTERBUR) 5 May 1925	
A	US, A, 3946656 (HARRY WONG HON HAI) 30 March 1976	
A	US, A, 2691351 (E.A. TURNER) 12 October 1954	
A	US, A, 3354843 (C. VELAZQUEZ) 28 November 1967	
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\* Special categories of cited documents: <sup>10</sup>

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in the art.

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## IV. CERTIFICATION

Date of the Actual Completion of the International Search

28th January 1986

Date of Mailing of this International Search Report

13 FEB. 1986

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

*M. M. VAN MOL*

# ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

INTERNATIONAL APPLICATION NO.

PCT/IT 85/00047 (SA 11385)

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 06/02/86

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A- 2691351		None	
US-A- 3354843		None	

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